

Use the distributive property to simplify each expression.

1. $3(5x - 7)$
 $15x - 21$

2. $-2(10 + 4y)$
 $-20 + (-8y)$
 $-20 - 8y$

3. $-\frac{1}{6}(3x - 12)$
 $-\frac{1}{6}(3x) - (-\frac{1}{6}(12))$
 $-\frac{1}{2}x + (+2)$
 $-\frac{1}{2}x + 2$

Feb 20-7:25 AM

Write each linear equation in standard form.

4. $y = -4x + 7$
 $-4x + y = -7$
 $4x + y = 7$

5. $2y - 3(4x + 23)$
 $2y - 12x - 69 = 0$
 $-12x + 2y = 69$
 $12x - 2y = -69$

6. $-8y = \frac{3}{5}x + \frac{1}{5}$
 $-8y - \frac{3}{5}x = \frac{1}{5}$
 $-3x + 2y = 27$
 $A = -3$
 $B = 2$
 $C = 27$

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$5(-8y) = (\frac{3}{5}x + \frac{1}{5})$
 $-40y = \frac{3}{5}x + \frac{1}{5}$
 $-3x - 40y = 1$
 $-3x - 40y = 1$

Feb 25-8:29 AM

Warm-up ~~Pick up~~ a calculator.
 Evaluate each expression.
 Simplify (Reduce)

① $\frac{11}{12} \times \frac{2}{3} = \frac{11}{18}$

② $\frac{11}{12} \div \frac{2}{3} = \frac{11}{8}$

③ $\frac{11}{12} - \frac{5}{12} = \frac{6}{12} = \frac{1}{2}$

④ $(-\frac{18}{7}) \times \frac{21}{72} = -\frac{3}{4}$

Feb 27-8:08 AM

Read the problem scenario below.

A bicycle company is trying to determine the number of bikes that they have sold. The company began in 1995. In the year 1997, the company sold a total of 285 bikes, and in the year 2000, the company sold a total of 684 bikes. Assume that the number of bikes sold is a linear function of the time in years since 1995.

7. Find the linear function that describes the total number of bikes sold as a function of the time in years since 1995.

8. Use the linear function to find the total number of bikes sold in 2010.

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Objectives

In this lesson, you will:

- Analyze cost and income equations.
- Graph cost and income equations on the same graph.
- Find the break-even point graphically.

Key Terms

- income
- profit
- point of intersection
- break-even point

Feb 20-7:26 AM

SCENARIO You have a part-time job at a company that makes and sells color art markers. As part of your job, you are studying the company's production costs. The markers are made one color at a time. It costs 2 each marker and there is 100 set-up cost. You are also studying the income, or the amount of money that the company earns, from the sales of the markers. The company sells the markers to office and art supply stores for 3.

A. Write an equation that gives the production cost in dollars to make one color of marker in terms of the number of markers produced. Be sure to describe what your variables represent. Use a complete sentence in your answer.

$2x + 100 = y$ (Cost) Expenses
 x represents markers
 y represents the total cost

B. Write an equation that gives the income in dollars in terms of the number of markers sold. Be sure to describe what your variables represent. Use a complete sentence in your answer.

$3x = I$
 x represents the number of marker
 I represents income.

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C. Find the production cost to make 80 markers of the same color. Show all your work and use a complete sentence in your answer.

$2x + 100 = y$
 $2(80) + 100 = y$
 $y = 260$
 It costs \$260 to make 80 markers.

Find the income from selling the 80 markers that you made. Show all your work and use a complete sentence in your answer.

$I = 3x$
 $I = 3(80)$
 $I = 240$
 If we sell 80 markers our income will be \$240.

Find the profit from the sale of the 80 markers that you made. Show all your work and use a complete sentence in your answer.

$P = I - y$
 $P = 240 - 260 = -20$
 The profit for selling 80 markers is -\$20.

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D. Find the production cost to make 100 markers of the same color. Show all your work and use a complete sentence in your answer.

$2x + 100 = y$
 $2(100) + 100 = y$
 $y = 300$
 $2(101) + 100 = 302$

Find the income from selling the 100 markers that you made. Show all your work and use a complete sentence in your answer.

$I = 300$
 $3(101) = 303$

Find the profit if 100 markers are made and sold. Show all your work and use a complete sentence in your answer.

$P = 300 - 300 = 0$
 Broke even.

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1. Complete the table of values that shows the production cost and income for different numbers of markers of the same color.

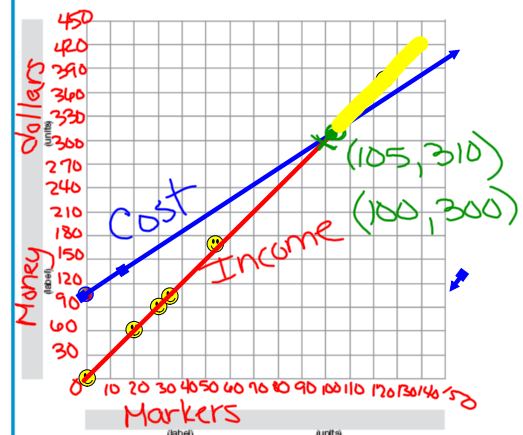
$y = 2x + 100$

Labels	Number of markers	Product cost	Income
Units	markers	dollars	dollars
Expressions	x	$2x + 100$	$3x$
	0	100	0
	20	140	60
	30	160	90
	35	170	105
	55	210	165
	125	350	375
	200	500	600
	400	900	1200

Handwritten notes: $400 \times 3 = 1200$, $\$25$, $\$100$, $\$300$

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Variable quantity	Lower bound	Upper bound	Interval
Markers	0	150	10
Money	0	450	30



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3. Use your graph to determine the numbers of markers for which the production cost is greater than the income. Use a complete sentence in your answer.

The production cost is greater than the income when the # of markers is less than 105.
Use complete sentences to explain how you found your answer.
We looked at where the lines intersected.

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4. Use your graph to determine the numbers of markers for which the income is greater than the production cost. Use a complete sentence in your answer.

Do #4-6.
More than 105 markers.

Use complete sentences to explain how you found your answer.

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5. Use your graph to determine the number of markers for which the income is equal to the production cost. Use a complete sentence in your answer.

@ 105

Use complete sentences to explain how you found your answer.

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6. Describe the numbers of markers that must be sold in order for your profit to be at least \$0. Use complete sentences to explain how you found your answer.

105

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Your work at the marker company has inspired you to start your own business. You decide to design and sell customized T-shirts. The company that supplies your T-shirts charges you 7.50 per T-shirt and a set-up cost of 22.50 for a new design. You decide to sell the T-shirts for 8.25.

- A. Write an equation that gives the production cost in dollars to make one design of T-shirt in terms of the number of T-shirts made. Be sure to describe what your variables represent. Use a complete sentence in your answer.

$$7.50x + \$22.50 = y$$

← Exp. Cost.

- B. Write an equation that gives the income (the amount of money that you earn) in dollars in terms of the number of T-shirts sold. Be sure to describe what your variables represent. Use a complete sentence in your answer.

$$8.25x = I$$

$$P = I - y$$

← shirts ← income.

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- C. Find the production cost to make 15 T-shirts in the same design. Show all your work and use a complete sentence in your answer.

$$7.50(15) + 22.50 = 135$$

Find the income from selling the 15 T-shirts that you made.

Show all your work and use a complete sentence in your answer.

$$8.25(15) = 123.75$$

Find the profit from the sale of the 15 T-shirts that you made.

Show all your work and use a complete sentence in your answer.

$$123.75 - 135 = 11.25$$

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- D. Find the production cost to make 30 T-shirts in the same design. Show all your work and use a complete sentence in your answer.

$$7.50(30) + 22.50 = 247.50$$

Find the income from selling the 30 T-shirts that you made.

Show all your work and use a complete sentence in your answer.

$$8.25(30) = 247.50$$

Find the profit if 30 T-shirts are made and sold. Show all your work and use a complete sentence in your answer.

$$P = 247.50 - 247.50$$

$$P = 0 \text{ Break Even}$$

Investigate Problem 2

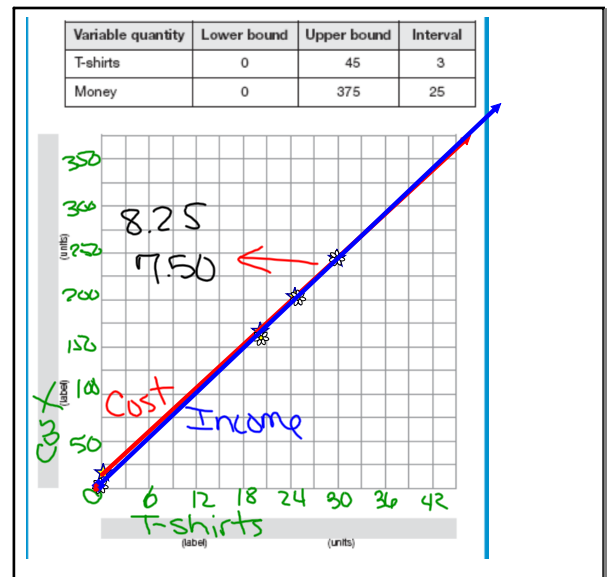
1. Complete the table of values on the next page that shows the production cost and income for different numbers of T-shirts in the same design.

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Labels	Number of T-shirts	Product cost	Income
Units	T-shirts	dollars	dollars
Expressions	x	$7.50x + 22.50$	$8.25x$
	0	22.50	0
	25	172.50	165
	30	247.50	247.5
	100	772.50	825
	200	1522.50	1650
	400	3022.5	3300

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3. Use your graph to determine the numbers of T-shirts for which the production cost is greater than the income. Use a complete sentence in your answer.

The cost is greater when we sell less than 30.

Use complete sentences to explain how you found your answer.

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4. Use your graph to determine the numbers of T-shirts for which the income is greater than the production cost. Use a complete sentence in your answer.

Greater than 30 shirts.

Use complete sentences to explain how you found your answer.

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5. Use your graph to determine the number of T-shirts for which the income is equal to the production cost. Use a complete sentence in your answer.

30 shirts.

Use complete sentences to explain how you found your answer.

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6. Describe the numbers of T-shirts that must be sold in order for your profit to be at least \$0. Use complete sentences to explain how you found your answer.

$P = I - C$ For our profit to be at \$0, the # of T-shirts sold needs to be at least 30.
 $I = 8.25(30) = 247.50$
 $C = 7.50(30) + 22.5$
 $C = 247.50$

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7. **Just the Math: Break-Even Point** When two graphs cross (or intersect) each other, the point where they cross is called a point of intersection. When one line represents the production cost of an item and the other line represents the income from selling the item, the coordinates of this point is called the break-even point. What is the break-even point for making and selling markers? Use a complete sentence in your answer.

The break-even point for marker sales is 100 markers.

What is the company's profit at the break-even point?
 Show your work and use a complete sentence in your answer.

$P = I - C$ The profit at the break-even point is \$0.
 $P = 300 - 300 = 0$
 The b-e pt. is 30 T-shirts.

What is your profit from the T-shirts at the break-even point?
 Show your work and use a complete sentence in your answer.

0

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Blank sheet.
 - # of problem.
 - Redo problem.
 - Attach to your original test.

Mar 4-9:33 AM